Patch Street Bridge
Spanning Kohanza Brook on Patch Street
Danbury
Fairfield County
Connecticut

HAER No. CT-30

HAER
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1-DA,
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PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Mid-Atlantic Region
Department of the Interior
Philadelphia, Pennsylvania 19106

HAER
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HISTORIC AMERICAN ENGINEERING RECORD

Patch Street Bridge

HAER No. CT-30

Location: Spanning Kohanza Brook on Patch Street
Danbury, Fairfield County, Connecticut

UTM: 18.629020.4584390
Quad: Danbury

Date of Construction: 1885; subsequent undated modifications

Builder/Designer: Peter C. Rowan, stonemason, Danbury, Connecticut

Present Owner: City of Danbury
City Hall
155 Deer Hill Avenue
Danbury, Connecticut 06810

Original Use: Vehicular and pedestrian bridge

Present Use: None; demolished March 3-6, 1986

Significance: The single arch stone Patch Street Bridge was a typical example of an increasingly rare class of municipally-built structure in Connecticut, and was the best preserved and perhaps most unusual such bridge built in Danbury during the generation of response to a disastrous flood. Stone bridge durability had widespread late-19th century appeal at heavily-trafficked or flood-prone crossings. The 1869 flood in Kohanza Brook, which destroyed or damaged a number of bridges including an earlier wood crossing at Patch Street, made the town especially sensitive to new crossings over this brook, and led to a partially successful policy of replacing local wood bridges in stone c1880-1900. This period was locally transitional between predominantly wood bridges and steel or concrete crossings. Most of the local stone bridges built in this period were double arched, an often less expensive alternative, and all three surviving bridges at West, North, and Crosby streets take this form. The narrow stream bed at Patch Street probably precluded this option, and the town voted for a single arch structure built by an aging but prominent local stonemason. Peter Rowan's single arch was unique among Danbury stone bridges surviving World War II, and his span of over 32 feet was perhaps one of the largest such municipal structures in the State.

Project Information: A Memorandum of Agreement among the city of Danbury, the Army Corps of Engineers, the Connecticut State Historic Preservation Officer, and the Advisory Council on Historic Preservation called for archival, photographic, and archeological documentation of the Patch Street Bridge, before and during bridge demolition for a road improvement project whose guardrail requirements exceeded the estimated strength of the bridge. Machine-assisted search for, and exposure of, subsurface features in and adjacent to the bridge during demolition revealed the foundation and interior drainage components discussed in this documentation. Research and preparation of this package occurred between August 1985 and June 1986.

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PART I. HISTORICAL INFORMATION

Local Development and Neighborhood History

Danbury began in the 1680s as an agricultural community with a trade outlet to Long Island Sound at Norwalk, by way of the valley of the Norwalk River. The town's emergence as a hatting center began shortly after the Revolution. While local growth was sufficient to warrant creation of a borough centered around south Main Street in 1822, industrial and commercial development remained extremely uneven until the arrival of the Danbury and Norwalk Railroad in 1852. This pivotal event led to the expansion of hat manufacturing at steam powered factories, and to increases of some 75% in local population and of some 200% in the number of workers at hat factories by 1860. With its depot near the junction of Main and White streets, the railroad also generated a new local commercial center about a half mile south of the later Patch Street Bridge.[1]

The bridge stood just south of the confluence of Kohanza and Padanarum brooks, tributaries of the Still River which flow south into the larger stream just below Crosby Street, about a half mile south of Patch Street. Still River, Danbury's major stream that flows east and north through the city, is a tributary of the Housatonic River with broad floodplain areas. To the north, Kohanza and Padanarum brooks run most of their courses through somewhat steep and narrow areas, once dotted with upland meadows or swamps. However, at their confluence, the brooks run through generally level areas of well-drained fine sandy loams. Until the late 19th century, the confluence was a flood-prone depression about 10 feet below adjacent level surfaces, much wider than at present and extending from the mill pond to the east side of the present Kohanza Brook channel. In 1850, this vicinity was entirely undeveloped, largely contained by the White farm south and east of the two brooks, with some land west of Kohanza Brook and north of Padanarum Brook at the rear of houselots along Main and North streets. Beginning in 1850, the creation of Wooster Cemetery immediately to the east as a park-like public space, along with increased local demand for housing near the new depot center, stimulated the growth of a residential/commercial neighborhood which included Patch Street (McCarthy 1852; Chase, Barker, and Hector 1856; Smith and Van Zant 1858; J. M. Bailey 1896: 39, 121; Clarke 1958; U. S. Department of Agriculture 1981; Devlin 1981, 1984: 33-35).

In 1858, Elizabeth White Balmforth, daughter of pioneer local hatmaker Russell White, acquired about 22 acres of the White farmland through inheritance and purchase from other heirs. In the following year, she sold eight acres between Kohanza Brook and the present Maple Avenue to brothers Darius and Jonathan Stevens. The brothers, then local builders who were relocating a saw and planing

[1] All references to the Patch Street bridge in this documentation mean the stone arch bridge, not the earlier wooden structures nor the bridge which replaced the stone arch bridge in 1986.

mill at Kohanza Brook at White Street, sold houselots and built homes on their own lots and elsewhere in the new neighborhoods, including lots sold by Elizabeth Balmforth Properties on what became Balmforth Avenue. Balmforth Avenue, begun as a shorter road from White Street to Wooster Cemetery, was opened to North Street by the town of Danbury in 1863. In that same year, the town opened Patch Street. between Balmforth Avenue and Main Street. Patch Street was originally a path west from Kohanza Brook at the northern limit of the Balmforth properties. The Stevens brothers obtained partial rights to the path and bought adjacent land from William Patch for access between their other land and Main Street. They opened Maple Avenue in the 1860s for access to their lots from the south, retaining land to the west for industrial purposes until the 1880s; the town accepted and widened this road in 1869-70. With these and other purchases, by the mid-1860s, the Stevens lands included all of the area around the later Patch Street Bridge, except a small parcel southwest of the bridge site (Beers 1867; Hopkins 1880; Devlin 1981).

The adjacent Balmforth and Stevens properties developed as somewhat different streetscapes and neighborhoods between c. 1860-1920, in large part, due to the owners' goals and tastes. Elizabeth Balmforth's lots along Balmforth Avenue and parts of the east side of Maple Avenue were generally larger and went to middle class merchants, hatmakers and workers, artisans, railway employees, and widows. She explicitly excluded industrial use and tenement development and, in the 1870s, built a large home for herself at the southwest corner of Patch Street and Balmforth Avenue to preside over her residential neighborhood to the south, with a local school across the street to the east. However, her control did not extend along Balmforth Avenue to the north, and more modest homes of laborers and several tenements appeared c.1870-1900 near two hat factories and a silver plating plant close to the confluence of the two brooks. Danbury development accelerated considerably after the 1881 opening of the New York and New England Railroad. Both parts of Balmforth Avenue reflected Danbury's increasing ethnic diversity, as Germans, first arriving in the 1870s, joined earlier Yankee and Irish residents, followed by Italians in c.1880-1920. The shop of blacksmith Henry Tine, who bought land just south of Padanarum Brook on the west side of Balmforth Avenue in the mid 1860s, was a kind of boundary between the two section of the street. Tine developed a three-story carriage-making shop here, which operated into the 1930s (Beers 1867; Hopkins 1880; Hurd 1893; Sanborn-Perris Map Co. 1892, 1897; Sanborn Map Co. 1904, 1909, 1919, 1929; Crofut or Price & Lee Co. directories; Devlin 1981, 1984: 40-43).

Unlike Elizabeth Balmforth, Darius and Jonathan Stevens evidently had no special aesthetic requirements in developing their property, although they complied with Balmforth's stipulation in her 1859 sale to them, restricting tenement or industrial development on the eight acres in question. They and other local landowners along Patch Street sold smaller lots than the Balmforths, generally to middle and working class hatters and laborers who built smaller houses than those on Balmforth Avenue c1865-80. As mill operators, the Stevenses retained much of their land for a pond and tailrace in a water power system that ran their sawing

and planing plant. As local builders, they concentrated on projects off their own lots, leaving to their brother William and others the later construction of homes along their Maple Avenue properties, beginning during Danbury's second economic boom in c.1885-1920. Most Patch Street homes predated the boom, but after 1900 some property in the project area immediately west of Kohanza Brook developed as boarding houses on filled land formerly part of the Stevens mill pond (Devlin 1981; see Figure 2).

Stream Management and Riparian Development on Patch Street

Except for the Tine home and blacksmith shop at 76-78 Balmforth Avenue, first developed in 1866, and a wooden bridge built by the town in 1868 to carry Patch Street over Kohanza Brook, the immediate area around the later Patch Street Bridge remained undeveloped until about 1870. The absence of buildings near the stream on Patch Street was fortunate. A flood in January 1869, caused by the failure of two recent water supply reservoir dams on upper Kohanza Brook, destroyed much of the property on upper Main, North, and White streets and killed five people. The flood also destroyed the Kohanza Brook bridges at these three streets, damaged the bridges at Patch Street and Balmforth Avenue. As outlined below, the Kohanza flood influenced the nature of local bridge construction for several decades, but in the immediate aftermath of the flood, the town replaced the wooden bridge at Patch Street in kind, with an undocumented truss type and stone abutments (Beers 1867; Danbury Times 1869; O. H. Bailey 1875; Beck & Pauli c 1884; Devlin 1981).

The Kohanza flood also damaged the Stevens & Co. lumber yard and mill at White Street. As part of the rebuilding process, or as part of an older plan to obtain water power from the brook in an area with little fall, the Stevenses completed a poorly documented but apparently unusual system in 1871. A dam just above the wooden Patch Street Bridge ponded the hollow in Kohanza Brook. A flume from the pond ran 1200-1300 feet west of Maple Avenue to a Leffel turbine,. which in turn powered a wire rope drive system to the mill another 1300 feet to the south. The wire rope system, designed by John A. Roebling's Sons, featured eight driving and transmission wheels, six of which hung in pairs from three towers twenty feet high. The approximate location of the Patch Street pond, somewhat west of Kohanza Brooks's present course, is shown in Figure 2. This is virtually no available information on the composition or precise location of the dam. By the early 1880s, Stevens & Co. abandoned this system, perhaps along with their business as the aging brothers ended their long building career and sold off building lots on the west side of Maple Avenue in the path of their power system and land at their pond. Completion of the New York and New England Railroad line in 1881 across their wire rope path may have accelerated their decision to shut down (Danbury Evening News 1872; O. H. Bailey 1875; Hopkins 1880; Beck & Pauli c1884: Devlin 1981).

The Stevens brothers sold most of the pond area to Theodore Brothwell and Louis Seaman in 1883, reserving a right to continue flooding the area which probably lapsed soon thereafter. Brothwell and Seaman were converting the Charles Chase

carriage factory, located on North Street along Kohanza Brook and abutting the Stevens property, to a steam-powered hatting factory. Their plant, which under various later owners operated into the 1930s and survives today as a furniture store, stopped just north of the project area, although they evidently began filling the Patch Street pond by 1890, using the open space to the south for refuse disposal. Filling of the pond area was essentially complete by the early 1890s, shifting Kohanza Brook to the east, although maps suggest the present course and the retaining walls above the bridge may not have appeared until a few years later. Edwin J. Duck, who purchased the rest of the pond area from the Jonathan Stevens estate in 1890, probably filled the southwest section (Danbury Book of Deeds 77:467, 92:485, 119:127-8, 122-273; Hopkins 1880; D. H. Hurd & Co. 1893; Sanborn-Perris Map Co. 1892, 1897; Sanborn Map Co. 1904, 1909, 1919, 1929).

The earliest structures near the Patch Street stream crossing were one or more undocumented, probably frame buildings associated with the surviving brick home, numbered 35, east of the brook and built c1875-80 by a local builder Ira Knapp. Stream movement, channel wall construction, and later sewer construction may have removed most traces of the frame structures, along with a similar building which stood on this lot briefly during the early 20th century. Across Kohanza Brook, the earliest home appeared at no. 29 about a decade later. Even closer to the brook, Edwin Duck apparently leased a small frame cobbler shop at the northwest corner of the Patch Street Bridge, c1898-1905, replacing the shop with a two-story frame building (nos. 31-33 Patch Street) by c1906. After briefly housing both boarders and a tin or plumbing shop, the latter structure was used exclusively for boarders, c1909-59, at the end of which period it was destroyed by fire, and later partially paved over by a driveway. Duck and subsequent owner Rosoliza Demeter also built a number of very small frame, brick, and concrete buildings used by boarders, c1906-25. None of the structures east of no. 29 survive (Figure 2; O. H. Bailey 1875; Hopkins 1880; Beck & Pauli c1884; Hurd 1893; Sanborn-Perris Map Co. 1892, 1897; Sanborn Map Co. 1904, 1909, 1919, 1929; Danbury Book of Deeds 172:308; Crofut or Price & Lee Co. directories; Devlin 1981).

Stone Arch Bridge Construction in Danbury and the Patch Street Bridge

Danbury's location encompassed the confluence of several Housatonic River tributaries, and town and borough expansion led, by the last third of the 19th century to the construction of hundreds of stream crossings of various sizes. At the time of the 1869 Kohanza flood, all but a handful of local bridge crossings were wood decks, usually on stone abutments and sometimes supported by wood trusses. The few exceptions were on important roads such as Main Street, along which the town built at least one double arched stone bridge over the Still River in c1867.1 There may have been a single arched stone bridge on Main Street over Kohanza Brook, although it appears only in an illustration of flood damage and not in town records. While the relative merits of stone or iron bridges were a topic of public discourse before the flood, as a practical matter of public finance, the less expensive and less durable wood bridges prevailed,

despite the eventual recognition of rot problems where deck supports rested on stone abutments. The complete or partial loss of five bridges in the Kohanza flood changed the tone and outcome of later such discussions. For some four decades afterwards, stone bridges were the preferred type of crossing over the larger streams in the town's more densely settled areas, although wood structures continued as the dominant type generally (Danbury Town Records (hereinafter DTR) 4: 405-6, 448, 523; Harper's Weekly 1869; Town of Danbury 1894-1956: 1913).

Surviving town records on bridge construction are very incomplete, in some cases being inadequate to determine whether authorized bridges were actually built. The town completed at least five, and possible as many as eight, stone bridges between 1869 and 1907, with most constructed c1885-1899 during a period of rapid population growth and urban expansion. There was a policy or preference in this period for replacing one bridge a year in stone, to diminish the frequency of bridge repairs, but in practice only larger or more flood-prone crossings received such treatment. Town voters and officials considered metal bridge alternatives throughout this period, but despite lower metal bridge costs, the perceived greater durability of stone proved to be the deciding factor at all larger crossings. Iron or steel bridges began appearing at smaller crossings c1893, replacing wood structures, but were rarely used at larger crossings before concrete bridges or metal culverts became widespread locally after 1910. In what is apparently the only surviving detailed comparison of alternatives, an 1897 engineering report to the town on the proposed bridge over Kohanza Brook at Crosby Street noted stone as the most durable material, but recommended a less expensive steel bridge because of the greater water area open under the span in the event of a flood. Voters authorized a double arched stone bridge for Crosby Street, which had the smallest water area but cost far less than a single arched stone bridge. This case of somewhat mixed signals on maximization of strength and flood prevention is of general local interest, since all but perhaps two of the completed stone bridges were double arched (DTR 4: 452, 5: 383, 410, 475, 582, 6: 44, 277-8, 555, 5: 89-95, 8: 93; Town of Danbury 1890, 1894-1956).

The four stone arch bridges in Danbury extant in early 1986 were at least half of all such structures built by the town, and as a group represented an important episode in local public works history following a disastrous flood. The Patch Street Bridge, with the only surviving single stone a arch in Danbury in early 1986, was authorized for construction in October 1885 and apparently completed by the end of the same year. It stands at a narrower, somewhat higher stream

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[2] The town of Danbury approved, purchased or built, and maintained all roads and bridges inside or outside the Borough of Danbury, through authorizations of its voters, the general responsibilities of its selectmen or, at times, the authority of special committees. Patch Street was near the northern end of the borough.

channel than do the three extant double arch bridges at North, Crosby, and West streets, built 1887, 1899, and c1888-89 respectively. Topographic constraints at Patch Street probably resulted in a slightly less locally-preferred design, since the narrow channel would have made construction of a double-arched structure difficult. Except for undocumented repairs after the 1955 flood, undocumented modifications of original drains discussed in Part II, and replacement of road surfaces and sidewalk fences, the Patch Street Bridge remained essentially unchanged throughout its century of life. Its arch, spanning 32 feet, was one of the longest in the State among town or city bridges (DTR 5: 582; Danbury Evening News 1885; cf. Roth et al. 1981).

During the late 19th century, many Connecticut towns favored the durability of stone arch bridges for important stream crossings. There were probably many local stonemasons with the skills needed to build such structures in this period, at least in cases requiring no special design or engineering features; at least one other Danbury stone bridge, at Crosby Street, had a design prepared by non-local stonemason and longtime resident of North Street in Danbury, built the Patch Street Bridge, not far from his home, after apparently coming out of semi-retirement. Rowan was about 69 years old when he built the Patch Street Bridge with unidentified assistants, and five years earlier had appeared in the U. S. Census as a farmer. During Danbury's first boom in the 1850s, he had directed foundation work at major local projects such as the Wooster House hotel (1851); the Danbury & Norwalk Railroad Station (1852), and the Wooster Monument (1854). City directories indicate that, until his death sometime in the early 1890s, he was perhaps the town's only stonemason during the peak of Danbury's stone bridge building program. His work may survive at some of the other extant local stone bridges, although this possibility requires confirmation (Danbury Evening News 1885; U. S. Bureau of the Census 1880; Berlin Iron Bridge Company 1895; Bailey 1896).

PART II. DESCRIPTIVE INFORMATION

General 1986 Condition of Patch Street and Other Danbury Stone Bridges

The Patch Street Bridge underwent many undocumented, minor repairs or alterations to its exterior and substantial modifications of its interior network of storm drains. However, it retained its original visual and structural integrity throughout its slightly more than 100 year existence. With the possible exception of masonry repointing, the arch, spandrel, and abutment or approach surfaces were never modified, although early 20th century filling of Kohanza Brook may have obscured some abutment ends and had no readily visible structural defects. A metal post and chain link fence, set in both copings over the keystones, spandrels, and abutments, was the only notable visual modification, other than the concrete sidewalks and black-topped road surface which replaced the original earth surfaces earlier in the 20th century. Three slabs forming the east side of the north coping fell off or were removed by mid 1985, but remained stored for a time on the west side of the stream, about 50 feet north

of the bridge. The strength of Peter Rowan's arch far surpassed original intended or anticipated local traffic loads, and carried extremely heavy equipment just prior to and during demolition procedures.

The surviving double arch bridges at North, Crosby, and West streets have arches 5-seven feet high, each spanning 15-20 feet. Low concrete parapets, set several courses above the voussoirs, modify all three structures. At least one, at Crosby Street, probably has pile foundations, according to both the 1897 engineering report and to an 1895 design drawing similar to visible as-built conditions (Berlin Iron Bridge Company 1895; DTR 7: 89-95). Additional post-1955 modifications at North Street also include a concrete wall extending some 15 feet downstream from the bridge center, and upstream concrete channel walls abutting the north face and supporting a commercial building, giving this bridge the least visual integrity of Danbury's remaining stone road crossings. All appear to have substantial original structural integrity. The Patch Street Bridge was the earliest and best-preserved of the four stone bridges extant in early 1986.

Dimensions and Materials of the Patch Street Bridge

The Patch Street Bridge was a single arch stone structure, about 42.5 feet wide and 70 feet long on its paved street surface, running east-west along Patch Street over Kohanza Brook. North and south bridge faces were not parallel, and the arch was skew to both faces at angles of about 18 and 22 degrees, respectively, to accommodate the relationship between the street and the brook. The arch spanned 32.3 feet at the gray clay brook bed, and rose 11.75 feet in a circular arc, encompassing 144 degrees of a 17-foot radius (Figure 4; elevation views). Granite-gneiss from the Mine Hill quarry at nearby Roxbury provided virtually all of the stone for the bridge. Except for the mortared rubble of its lower 3-4 feet, all stones forming the arch were mortared, roughly-cut slabs 4-6 feet long, 5-8 feet wide, and about 1.8 feet thick, with no special treatment of the approximately 54 voussoirs on each side (interior arch views and detail view of demolition-exposed northeast arch section). The abutments were mortared rubble and extended for varying distances from the arch bottom to the 1986 stream banks--four feet on the northwest corner; 12 feet on the northeast corner, 10 feet on the southeast corner, and 24 feet on the southwest corner (see Figure 2). Top-stone granite-gneiss slabs 6-9 feet long (with shorter stones over the arch center), 1.5 feet wide, and .8 feet thick formed a coping over the arch, spandrels, and abutments about flush with the 6-foot-wide sidewalks. The coping rested directly on the central voussoirs, tapering down towards the abutment ends to create a slightly curved upper bridge elevation (Danbury Evening News 1885; Gates 1959).

Original Construction

Peter Rowan apparently removed all parts of the narrower wooden bridge at this site before beginning construction, leaving no footbridge during the

approximately six weeks required to complete the arch and restore an unfinished crossing. Foundation work included placing a double layer of perpendicular 10-foot-long, 2.5 by 10-inch boards directly on the clay stream bed along the arch bases, with the lower layer oriented east-west. A half-inch of mortar on the uppermost boards bonded the simple spread footings to very large flat pieces of rubble, about 1.25 feet thick and 4 by 3 feet in area (detail views of footings and foundation stone). There is no record of Rowan building any coffer dams, and the proximity of the presumed Stevens & Co. dam and pond--probably extant through most or all of the 1880s--may have precluded the need for such temporary measures. Hoists probably set the larger stones in position, as the builders placed massive rubble below, at, and immediate behind the base of the stone arch. The lower rubble courses of the arch compare directly with those visible in a three-photograph sequence of stone arch construction thirty years later in Woodstock, Connecticut, where placement of the lower abutments and the arch bottom preceded erection of wooden falsework arches (Wetherill Collection c1915). Rowan probably set up four or five of the latter, resting on stones and joined at the top by boards, to complete the arch by December 1, 1885 with mortared interior surfaces, while gradually building up the adjacent abutment backing of large rubble, maintaining the finished outer abutment faces (Danbury Evening News 1885; view of exposed arch section).

The large rubble abutment fill served only to secure the arch, and sloped down 25-30 feet from either side of the crest to point some 4-5 feet below the road surface. Dirt and smaller rubble fill above this base created the original road surface, graded two days after arch completion. The final stages of stone erection involved completing mortared spandrel and abutment walls along and above the fill, with unmortared rubble backings. Rowan's workers mortared all exterior bridge surfaces, probably after removal of the falsework, to inhibit water damage (view of exposed northwest approach wall; detail view of northeast aRch section).

During foundation and arch construction, Rowan had to build seven passages through the bridge for sewage, and storm water drained directly into Kohanza Brook. The lowest of these is an elliptical-sectioned, 3 by 3-foot brick sewer whose brick base, about 4 inches wide on either side and 5 inches high, rested directly on timber footings, probably continuous with those supporting the arch. Except at the two-brick-thick base, and as needed where the sewer exited through the southwest arch exterior, this feature was one 8 by 4 by 2.5-inch brick thick. The sewer ran back from the arch about 32 feet northwest to a 23-inch-diameter brick manhole in the center of Patch Street, meeting the manhole some 8.75 feet beneath the present street surface. Although the manhole is now inactive, the sewer beneath the bridge was completely intact at the time of demolition (Figures 3 and 4; detail view of southwest arch interior; overhead and section views of sewer).

Modifications

There were few apparent subsequent changes to the Patch Street Bridge exterior, other than the repointing and the added fences and traffic surfaces noted above, but the city rebuilt or removed most of the storm drains in several undocumented episodes. The original southeast and west central drains disappeared completely, replaced by a 15-inch-diameter reinforced concrete pipe and a sectional 20-inch-diameter ceramic pipe, respectively. Some or all of the lower masonry channels survive at the east central, northwest, and southwest drains, with 15-inch-diameter reinforced concrete pipes installed in the latter two features. All later drain projects replaced the vertical shafts with sloped pipes running back from the bridge.

1986 Condition of Structures Built At or Around the Patch Street Bridge Site

Between 1868 and 1885, one or two wood bridges crossed Kohanza Brook at Patch Street. Maps indicate the last of these structures, built or rebuilt in 1869 after the Kohanza flood, was about 25 feet wide and with one 70-foot-long-span, within the limits of the Patch Street Bridge. Patch Street Bridge construction probably removed all traces of the abutments for the wood bridge.

The Stevens & Co. dam has likewise left no traces, but a 2-foot-diameter wooden pipe running northwest-southeast under the northwest corner of Patch Street Bridge arch may have been associated with the vanished structure. The elevation and exposed extent of the barrel-like pipe, banded with wrought iron hoops[3], clearly give this feature a construction date preceding that of the Patch Street Bridge (Figures 3 and 4; also see detailed view shop through water under northwest arch interior). Vertical 2 by 4-inch boards around the pipe brace the portion that was exposed in fill but removed during demolition.

About 18 feet east of the house at 29 Patch Street, exposure of the northwest Patch Street Bridge approach revealed a 5-foot-high mortared rubble retaining wall, running north from the bridge end several feet below a present blacktopped driveway (visible in the view of this exposed approach). This feature may be part of the west foundation wall of 31-33 Patch Street, the two-story shop and boarding house which stood near the bridge c1906-59. A similar but shorter and less-preserved wall exposed 17 feet to the east, adjacent to the bridge, may have been part of the foundation of a smaller cobbler shop at the bridge corner c1898-1905 (Figure 3). Limited excavations at this site in 1985 indicated that small concrete pillars supported at least some of the superstructure walls, probably including those nearest the brook (Raber 1985).

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[3] Metallographic analysis by Professor Robert B. Gordon, a historical metallurgist with the Yale University Department of Geology and Geophysics, indentified one of the recovered hoops as a high quality wrought iron.

Unmortared boulder and rubble walls lined Kohanza Brook north of the Patch Street Bridge in 1986, more or less in line with the arch bottom, retaining the sand, brick, cobble, boulder, and asphalt fill which, west of the brook, rose from just above the waterline to the elevation which included the demolished Patch Street house site. The stream bank southwest of the bridge was unretained,, but the southeast corner of the bridge arch met a low mortared rubble wall topped with concrete and a chain link fence. None of the stream channel walls are documented, but probably date to the early 20th century, based on Patch Street house development chronologies (Figure 3; views of north and south elevations).

PART III. SOURCES OF INFORMATION

Searches in the collections of the Danbury City Library, the Scott-Fanton Museum in Danbury, and the Danbury City Engineering Department yielded no drawings, records of modifications, or historic views of the Patch Street Bridge, leaving the bridge itself as a principal primary source of design, construction, and alteration information. The bibliography presented below relates largely to background information on local historic development and stone bridge building.

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Vogt. C. H.
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Likely Sources Not Yet Investigated

There appears to be little, if any, chance of recovering additional direct documentary information on the Patch Street Bridge. Further research in local newspaper accounts of other contemporary stone bridge work could provide fuller historical context on questions such as builders' identities and special construction problems. It is also possible that city engineering data on the other three surviving stone bridges could include information on modifications comparable in type or time to those found at the Patch Street Bridge.

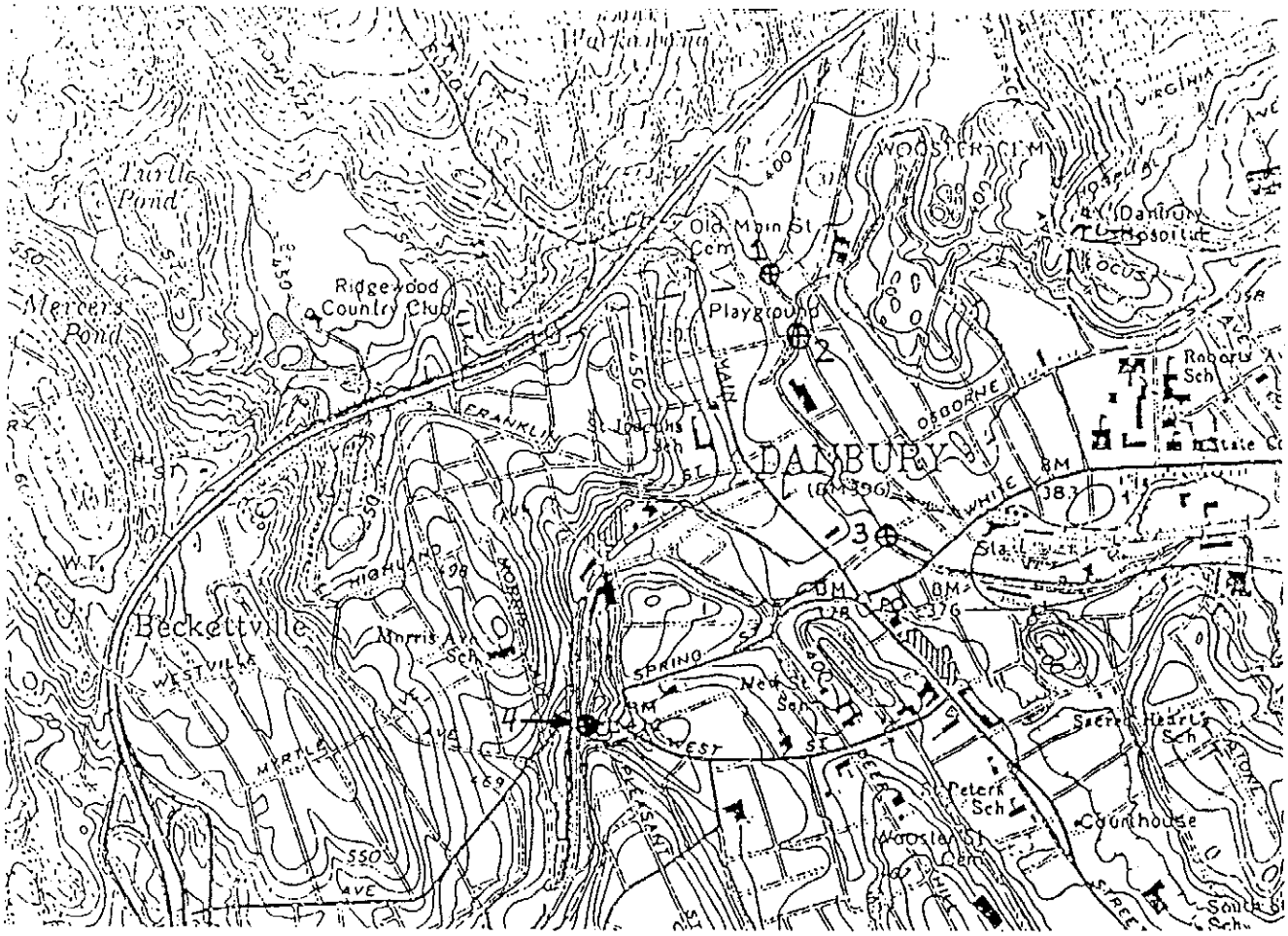

Figure 1. DANBURY STONE BRIDGE LOCATIONS, 1986

1 North Street
2 Patch Street
3 Crosby Street
4 West Street

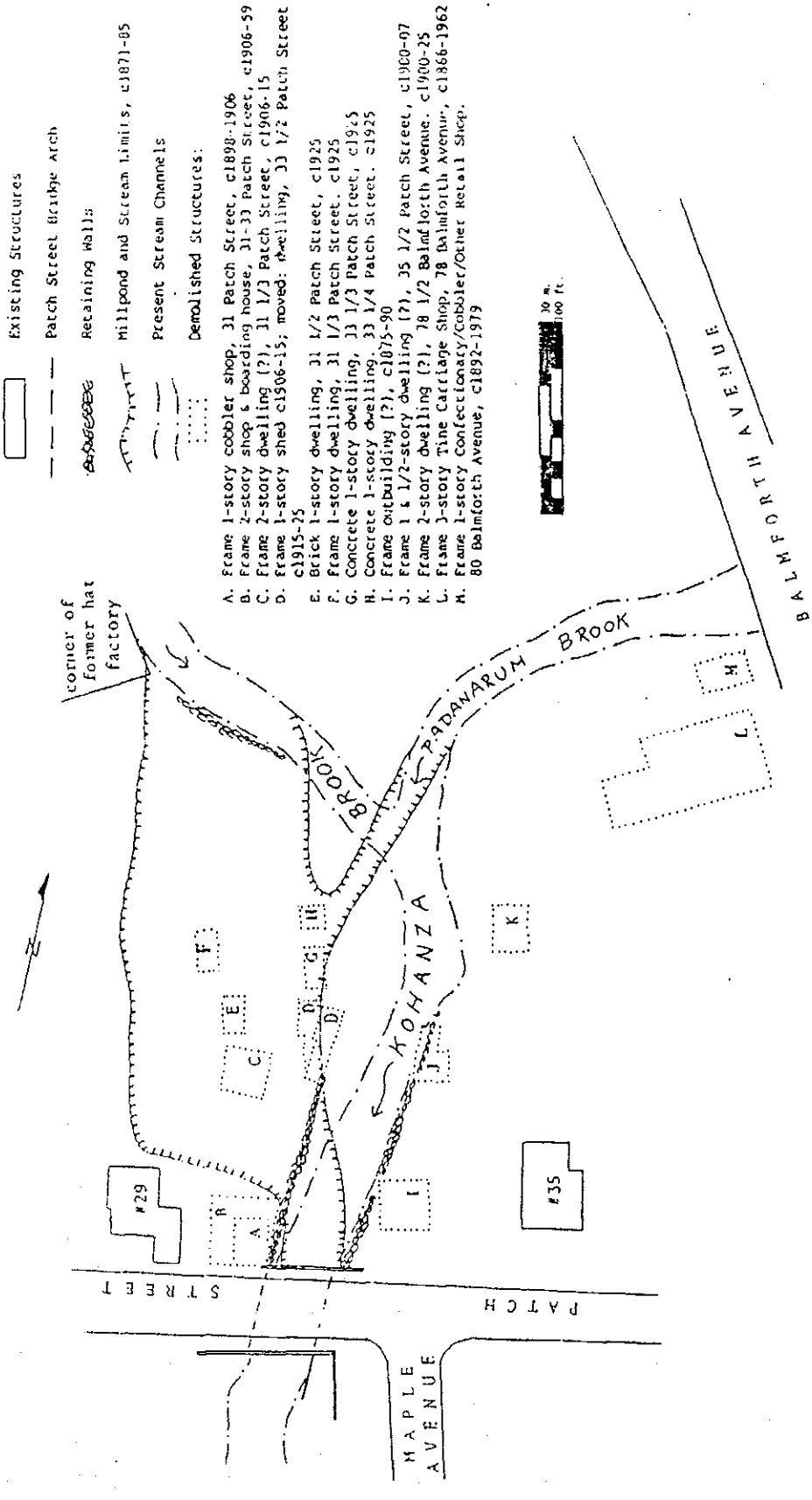

Figure 2. HISTORIC DEVELOPMENT IN PATCH STREET BRIDGE VICINITY

Patch Street Bridge Arch Bottom

Stream Channel

Visible Retaining Walls

Buried Retaining Walls, Foundation Walls, or Bridge Coping

+ 387.92 — Surface Elevations (feet above mean sea level)

+(376.97) — Subsurface Elevations

---------- Buried Pipes or Drains

A. 2-foot-diameter wood pipe
B. Partial masonry channel remains, below 15-inch-diameter RCP
C. 20-inch-diameter ceramic pipe
D. Elliptical brick sewer, 3-by-2 feet
E. 15-inch-diameter RCP in masonry channel remains
F. Intact masonry shaft and channel
G. Intact masonry channel; shaft removed
H. 15-inch-diameter RCP

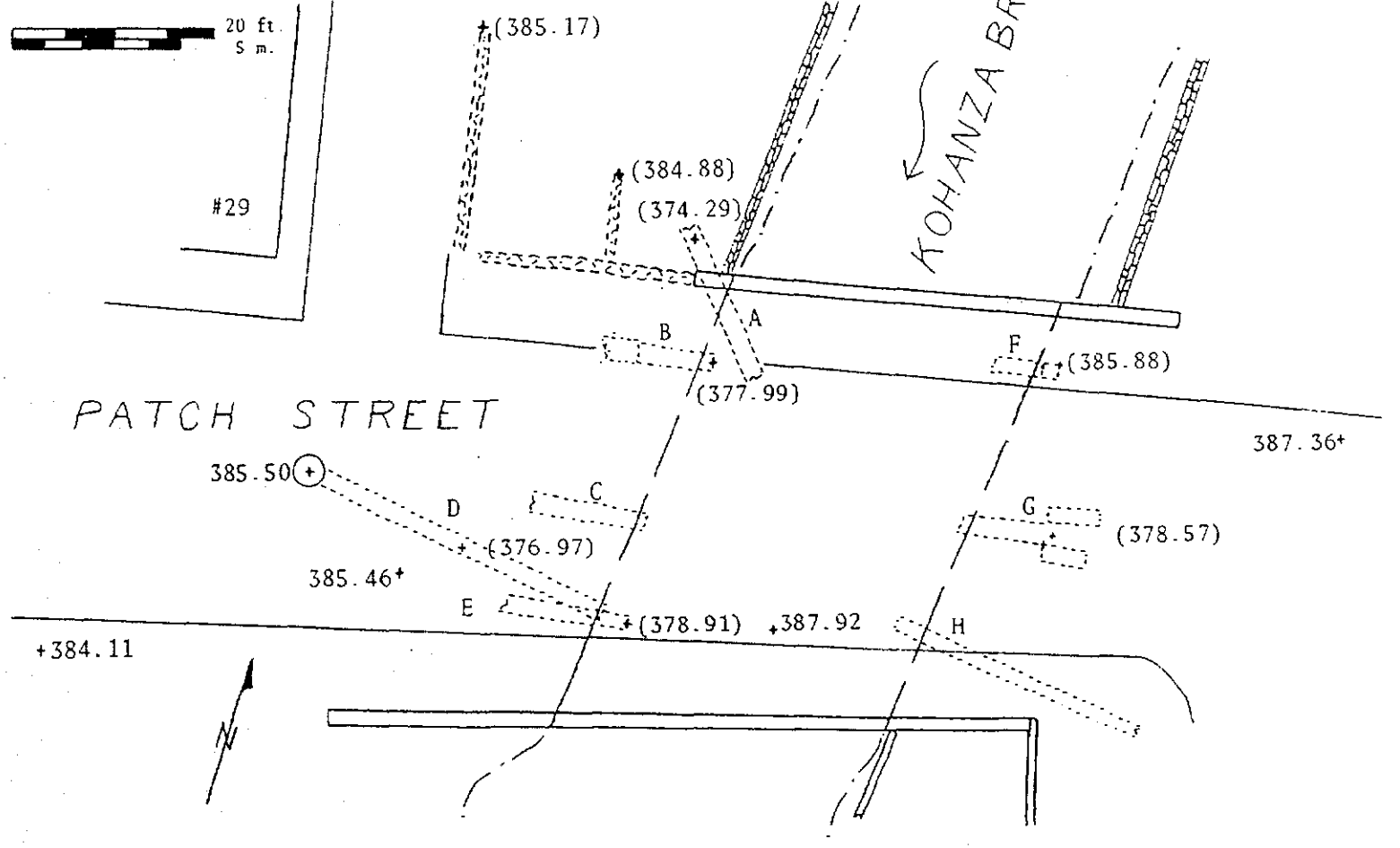

Figure 3. BURIED FEATURES AT PATCH STREET BRIDGE

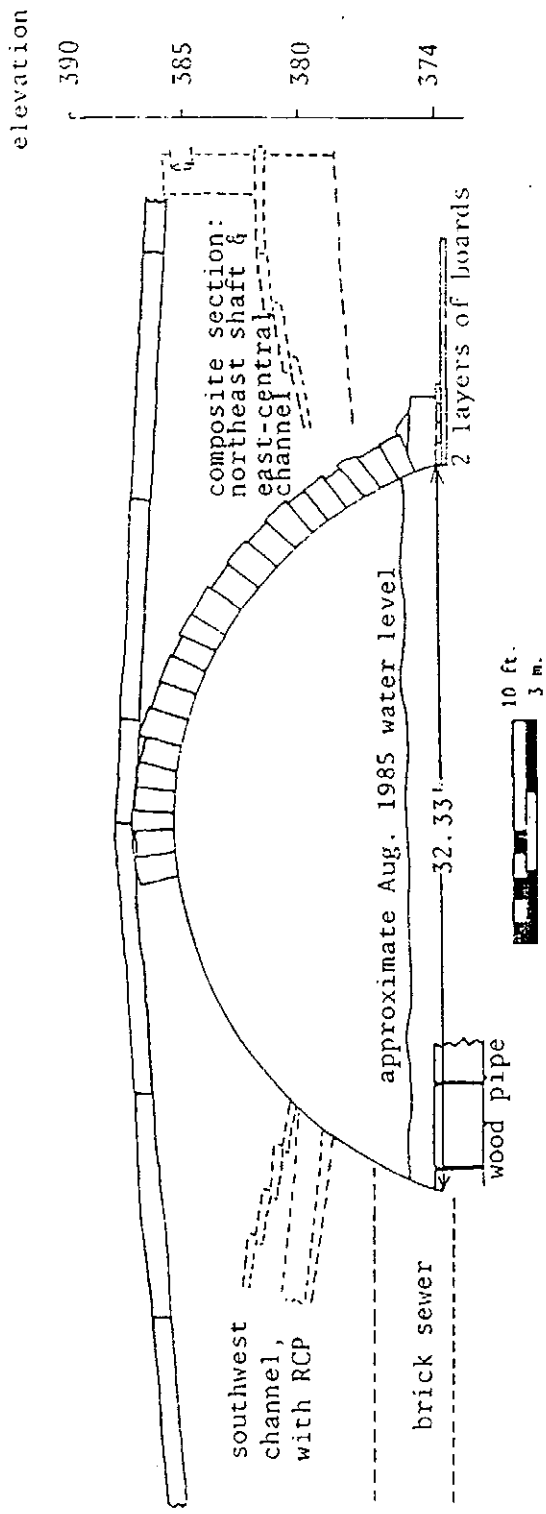

Figure 4. SCHEMATIC SOUTH ELEVATION, WITH SUBSURFACE FEATURES

KEY TO PHOTOGRAPHS